The failure of shock therapy during the Chilean military dictatorship (1974–1979)[1]

Rodrigo Caputo and Félix Ordóñez

Received: 08/04/2024
Accepted: 13/06/2024

Abstract

This article analyses Chile's monetary policy following the 1973 military coup and the failed attempt at nominal stabilization during the dictatorship. Two causes of persistent inflation are identified: (i) the narrowing of the fiscal deficit in 1974 was insufficient to curb high monetary issuance and inflation, thus perpetuating the inflation needed to finance the fiscal deficits; and (ii) the perception by economic agents that fiscal needs, financed through seigniorage, would not slow the growth of the monetary base and inflation. This perception kept inflation levels high following the coup. For the shock therapy to succeed, a greater reduction of the fiscal deficit and a perception that these lower deficits would be permanent would have been necessary. In the absence of a credible deficit reduction policy, inflation did not stabilize until the late 1970s.

Keywords

Monetary policy, fiscal policy, tax administration, inflation, money, budget deficit, economic stabilization, mathematical models, Chile.

JEL classification

E31, E52, H62.

Authors

Rodrigo Caputo is an associate professor in the Faculty of Management and Economics of the University of Santiago de Chile. Email rodrigo.caputo@usach.cl.

Félix Ordóñez is a researcher in the Faculty of Management and Economics of the University of Santiago de Chile. Email felix.ordonez@usach.cl.

[1] The authors wish to thank the University of Santiago de Chile and its Department of Scientific and Technological Research (DICYT) for supporting this research through fund 032262CG. They are also grateful for the valuable comments and suggestions of the two anonymous referees.

The key economic problems of Chile are clearly twofold: inflation, and the promotion of a healthy social market economy. [...] There is only one way to end the inflation: by reducing drastically the rate of increase in the quantity of money. In Chile's situation the only way to reduce the rate of increase in the quantity of money is to reduce the fiscal deficit. [...] Such a shock program could end inflation in months […].

Milton Friedman
Letter to General Pinochet, 21 April 1975[2]

I. Introduction

On 11 September 1973, a military coup in Chile, led by Augusto Pinochet, overthrew the elected president, Salvador Allende Gossens. After taking office in November 1970, Allende had introduced a series of unprecedented economic and social reforms, which generated, among other things, a considerable increase in public spending. In macroeconomic terms, one of the characteristics of the Allende government was the significant widening of fiscal deficits. In the absence of external and internal sources of financing, these deficits were financed through monetary issuance (i.e. money printed by the central bank). This monetary expansion accelerated inflation, which rose from 22% in December 1971 to 163% in 1972 and 286% in 1973 (see Caputo and Saravia, 2022). Rising inflation, which soared to unprecedented levels, became one of the major macroeconomic problems of the Allende government.

Yet, the military coup of September 1973 triggered a drastic change in the country's economic management.[3] The armed forces appointed military officers to several key positions, who, together with civilian supporters of the military dictatorship, took control of the regime's economic policies. Army General Eduardo Cano Quijada was appointed Governor of the Central Bank of Chile, while Lorenzo Gotuzzo Borlando, former Rear Admiral of the Chilean Navy, was named Minister of Finance. The Allende government's economic authorities were not only immediately dismissed from their posts but, in many cases, suffered the direct consequences of the dictatorship's systematic repression of the civilian population.[4]

In theory, a drastic change in the conduct of fiscal and monetary policy by the Ministry of Finance and the Central Bank, respectively, could have created the conditions needed to reduce fiscal deficits, issuance and inflation. Such policies are what Milton Friedman referred to as a "shock program", which he recommended during his visit to Chile and in the letter written to Pinochet in 1975 (see Friedman and Friedman, 1998). Had they been successful, such shock therapy measures would have lowered in inflation within months, according to Friedman himself. Monetarist models such as those of Cagan (1956) and Sargent (2013) that aim to explain hyperinflationary processes and their dependence on fiscal deficits and monetary issuance point to similar conclusions. Specifically, under these models, unanticipated, drastic and credible changes in the conduct of fiscal and monetary policy can prompt immediate changes in hyperinflationary processes.[5]

[2] See Friedman and Friedman (1998).

[3] See Carrasco (2009) for an in-depth analysis of the monetary policy since the founding of the Central Bank of Chile.

[4] Following the military coup in September 1973, Carlos Tulio Matus Romo, Minister of Economy in the Allende government, was arrested and imprisoned, initially on Dawson Island, a concentration camp established by the dictatorship in southern Chile, and later in Ritoque, in the region of Valparaiso. Matus was released in 1975 and went into exile in the Bolivarian Republic of Venezuela, where he lived until his death in 1998. Jaime Barrios Meza, an economic adviser to Allende and former General Manager of the Central Bank of Chile, was arrested on the day of the coup. He was transferred to Artillery Regiment No. 1 "Tacna", where he remained until 13 September, when he was transported by military truck to an undisclosed destination and remains missing to this day.

[5] Sargent (2013) provides an example of this when referring to the way in which inflation was reduced in France at the start of the twentieth century. This process was the result of a credible change in economic policy. Specifically, the government of Raymond Poincaré faced major economic challenges in the period following World War I, including massive war debt and reparations owed to other countries. To stabilize the French economy, Poincaré implemented stringent fiscal measures, which included the introduction of a new currency —the Poincaré franc— and a strict inflation reduction policy.

Sargent, Williams and Zha (2009) study the hyperinflations of the 1970s and 1980s in several countries of Latin America, including Chile, through the lens of monetarist models in which the main element is a demand for money that hinges on inflation expectations. This also assumes the existence of a fiscal deficit that is financed wholly or in part by monetary issuance. Sargent, Williams and Zha (2009) posit that hyperinflation is explained both by changes in fundamentals in the form of government deficits financed by money creation and destabilizing expectation dynamics that can occasionally divorce inflation from fundamentals. They conclude that the levels and conditional volatilities of monetized deficits drove most of the region's hyperinflations and stabilizations, with the exception of Peru.

Phylaktis and Taylor (1993) studied the use of monetarist models based on demand for money in Chile and other economies of Latin America. The study's empirical results confirm that Cagan's model can be applied to Latin American economies with high inflation, particularly Chile. A significant and negative relationship can be found between the demand for money and expected inflation, which coincides with the model's theoretical predictions. This relationship is stable, which aligns with Caputo (2022), who, applying Cagan's model to the Chilean economy of the 1970s, identifies the level of inflation and the period in which it would have maximized the collection of the inflation tax.

The first five years of Chile's military dictatorship, from 1974 to 1979, were marked by high inflation that only began to stabilize in 1979.[6] In this sense, this study sets out to understand why —despite the radical political and economic changes following the 1973 military coup— Chile was unable to successfully implement an economic shock therapy that would have reduced fiscal deficits, monetary issuance and inflation.

To answer this question, we develop a theoretical model based on Cagan (1956) to understand the determinants of inflation expectations. In keeping with the literature, we identify a demand for money that is contingent on the expectation of future inflation. We also incorporate several new elements. First, the demand for money is allowed to respond to product levels, which is unusual for this type of model. Second, the relationship between fiscal deficits and monetary issuance is determined based on general government (which includes the central bank) budget constraints. Third, the relationship between inflation expectations and expected issuance in future periods is determined, in a context of rational expectations. Lastly, we find a closed-form solution that links monetary issuance to fiscal deficits and the liquidity in the economy. In this way, we find an analytical, or closed-form, expression that relates inflation expectations to fiscal deficits and liquidity.

The following key results were obtained from the theoretical model: first, expected inflation is a function of the expected issuance growth rate and, second, the growth of issuance depends, in a non-linear way, on the fiscal deficits to be financed and, inversely, on the liquidity in the economy. On the basis of this model, we conclude that the fall in the fiscal deficit in 1974 was unable to curb the high monetary issuance rate or to dampen actual (and expected) inflation observed up to 1973. This can be attributed not only to the insufficient narrowing of the fiscal deficit, but also to the reduced liquidity in the economy —understood as a smaller monetary base relative to GDP— as of 1974. The latter amounts to a reduction in the inflation tax base, perpetuating the high levels of issuance and inflation needed to finance a given fiscal deficit. The second cause, which is linked to the first, is that economic agents perceived that monetary and fiscal policy from 1974 onwards would not be able to slow the growth of the monetary base and inflation.

In light of the data and the model developed in this paper, we conclude that for shock therapy to have been successful, it would have required a greater reduction in the fiscal deficit after 1973, coupled with the perception that these lower deficits would be sustained over time. In the absence of a credible

[6] In 1979, Chile adopted a fixed exchange rate regime. This implies delegating monetary policy to another country, in this case the United States, and adopting that country's inflation levels.

deficit reduction policy, inflation only stabilized in the late 1970s, which according to monetarist models amounts to a nominal adjustment that is not perceived as immediate and is postponed pre-emptively into the future.

This paper is organized as follows. Section II presents a discussion of the historical context framing the economic policies of the Allende government (1970–1973) and the first years of the military dictatorship (1974–1979). In section III, we construct a monetarist model with rational expectations that explicitly incorporates the budgetary constraints of the treasury and the Central Bank. This model follows in the tradition of Cagan (1956), Phylaktis and Taylor (1993), Sargent, Williams and Zha (2009), Sargent (2013) and Caputo (2022). In section IV, the model is used to quantify the impact that fiscal deficits and liquidity would have had on expectations linked to inflation and the conduct of fiscal and monetary policy from 1974 onwards. Lastly, section V presents the conclusions.

II. Historical context: monetary policy and fiscal dominance

The government of Salvador Allende (November 1970–September 1973) is widely recognized as having brought about extensive economic and social transformation. Salvador Allende's rise to power in 1970 marked an important milestone in Chilean history.[7] Allende, leader of the left-wing Popular Unity coalition, campaigned on a programme that differed radically from that of his predecessors and won the presidential election with 37% of the vote. His government was committed to implementing socialist reforms and during this time, Chile underwent a series of reforms that sought a more equitable redistribution of wealth and economic power, with a focus on nationalizing major industries and expanding the public sector. Some of the main economic achievements of the Allende government are detailed below:

(i) Nationalization of key industries: one of the main measures taken by the Allende government was to nationalize major economic sectors, including copper, iron and saltpetre mining. These industries came under State control with the aim of directing their profits towards social and development programmes. This policy raised concerns about the State's efficiency and management capacity in strategic economic sectors and a significant expansion of fiscal spending.

(ii) Land reform: the Allende government implemented or followed through on ambitious land reform efforts that sought to redistribute land held by large landowners among farmers and agricultural communities. Such measures aimed to increase agricultural production and improve the living standards of rural workers.

(iii) Price and wage controls: to combat inflation, the Allende government implemented price and wage controls. While these measures sought to protect purchasing power and control inflation, they also led to market distortions and the scarcity of certain goods.

(iv) Public sector expansion: the State played an increasingly important role in the economy during the Allende government, with the creation of State-owned enterprises in various sectors, including mining, manufacturing and public services. At the same time, social spending rose sharply.

[7] There is extensive academic literature examining the main events that occurred during the Allende government, as well as the consequences of the military coup. Notable articles include: Ffrench-Davis (1979, 1983 and 2003); Corbo (1985); Edwards and Edwards (1987); Larraín and Meller (1991); Bosworth, Dornbusch and Labán (1994); Corbo and Fischer (1994); Velasco (1994); Larraín and Vergara (2000); Aldunate and others (2020); González, Prem and Urzúa (2020); González and Vial (2021); and, more recently, Caputo and Saravia (2022), González and Prem (2023), Edwards (2023) and Caputo (2024).

As mentioned by Caputo (2025), a fundamental premise of the economic programme was that the manufacturing sector had considerably underutilized capital capacity in 1970. Against this background, it was expected that the increased aggregate demand could be met without creating short-term inflationary pressures (Edwards and Edwards, 1987). As a result, an aggressive expansionary fiscal policy was implemented in 1971. The fiscal deficit widened from 0.5% of GDP in 1970 to 7.3% in 1971, while the nominal growth of high-powered money went from 66% in 1970 to 136% in 1971. Not surprisingly, aggregate demand grew at double-digit rates (10.5% in 1971), while real GDP expanded by 9.4% and unemployment fell sharply to 3.9%.

The Popular Front government recognized that it was troubled by fundamental problems, such as stagnant production and high inflation. In 1971, Pedro Vuskovic, then Minister of Economy, pointed out that other imbalances and problems unresolved by the system translated into persistently steep inflation: the average annual increase in the domestic prices for the previous decade was almost 28%. In less than 15 years, the country had experienced three anti-inflation programmes[8] that turned out to be equally ineffective in the short term, with most of the working population suffering their consequences (Vuskovic, 1971).

Prices did not rise substantially in the first year of the Allende government, owing to the presence of price controls together with rationing in goods and factor markets. While the 1970 agreement between the Amalgamated Worker's Union and the government established a substantial readjustment of public and private sector wages (for example, minimum wages would increase at a rate equivalent to 66.7%), the 1971–1972 agreement between the same parties established active price controls. Vuskovic (1971) posited that beyond its primary objective, price control policy effectively curtailed inflation expectations, which have historically contributed to strong inflationary pressures. As highlighted by Edwards (2023) and noted by Vuskovic (1971), this followed the assumption that businesses were capable of absorbing the adjustment through their profits.

The expansion of production achieved in 1971 was not sustained in the following years. On the external front, the government declared a moratorium on its existing external debt in 1971. This resulted in a default on external obligations in 1972, according to Reinhart and Rogoff (2009). The moratorium meant that Chile faced a lack of external financing. In the absence of sufficient domestic and foreign funding to cover the fiscal deficit and interest payments on debt, the government came to rely on the inflation tax (monetary issuance) as a source of financing. Between 1971 and 1974, the fiscal deficit and seigniorage showed similar trends.

In 1972, the fiscal deficit widened further, rising to 11.4% of GDP. The monetary expansion rate was 178% and, despite official controls, prices could not be contained: annual inflation climbed almost 255%. The Allende government's expropriation of manufacturing companies gave rise to a particularly serious problem in terms of real activity. Government interventions were often preceded by lengthy labour strikes and workers' occupations of company facilities, which led to significant production losses. In October 1972, a national strike led to a further decline in activity. That year, real production fell by 1.2% and the trade deficit rose to 3.5% of GDP (see Edwards and Edwards, 1987).

In 1973, the economic and social crisis deepened. Various factors exacerbated the conflict, including worsening economic conditions (for example, exchange rate devaluation and a deterioration in the balance of payments and real wages), nationalization programmes, political conflicts within the governing coalition and foreign intervention (González and Prem, 2023; Edwards, 2023). That year, the fiscal deficit almost doubled to reach 23% of GDP, the highest level recorded in 40 years. At the same time, inflation was tipping towards hyperinflation. Average inflation rose to 433% in 1973, while the monetary expansion rate stood at 365%.

[8] These anti-inflation programmes refer to those developed in the context of the Klein-Saks mission and those of the Alessandri and Frei Montalva governments (Nazer, 2021).

The polarization within Salvador Allende's government may have influenced price dynamics as it exacerbated the monetary factors affecting prices. Rowthorn (1977) models how conflict influences price dynamics through income distribution. More recently, Lorenzoni and Werning (2023) revisited this topic, arguing that disagreement or conflict owing to different aspirations for relative prices has general inflationary effects on all prices.

The information presented thus far indicates that fiscal deficits, which increased substantially between 1971 and 1973, could not be fully financed through additional public debt (domestic and external). Consequently, monetary issuance (inflation tax) became the most important source of revenue for tax authorities. The result of this strategy was that inflation ultimately became a fiscal issue.

How different was the relationship between fiscal deficits, monetary issuance and inflation in the Allende government? As shown in table 1, under the pre-Allende governments, particularly those of Alessandri (1958–1964) and Frei Montalva (1964–1970), inflation was close to 25%, while fiscal deficits were around 2% of GDP.

Table 1
Chile: macroeconomic indicators, 1960–1990

Period	Average annual GDP growth *(Percentages)*	Fiscal deficit *(Percentages of GDP)*	Price of copper *(United States cents per pound)*	Annual average inflation *(Percentages)*	Unemployment rate *(Percentages of unemployed persons in the labour force)*	Annual average growth of monetary issuance *(Percentages)*
1958–1964 (Alessandri)	4.5	2.9	32.5	25.3	7.5	39.1
1964–1970 (Frei Montalva)	4.2	0.6	56.7	26.1	5.6	45.1
1970–1973 (Allende)	1.0	13.7	58.9	231.2	4.1	226.4
1973–1980 (Pinochet I)	4.0	-0.3	73.9	150.7	12.6	159.4
1980–1990 (Pinochet II)	3.1	-1.0	79.7	19.5	11.8	16.1

Source: R. Caputo, "Política monetaria en Chile desde 1970: persistente inflación y dominancia fiscal", *Historia económica de Chile: más allá del crecimiento*, M. Llorca-Jaña and R. Miller (eds.), 2025.

As noted by Caputo (2025), the close relationship between fiscal deficits, issuance and inflation was not unique to the Allende government. Chile had experienced high levels of inflation since the 1940s, but it became a pressing concern in the 1950s. In an effort to address this problem, in July 1955, the government contracted the Klein-Saks mission to provide technical assistance on anti-inflation policy. According to Edwards (2007), the mission's assessment of inflationary pressures in Chile focused on four main areas: (i) fiscal deficit, (ii) monetary expansion, (iii) exchange-rate policy and (iv) wage policy.

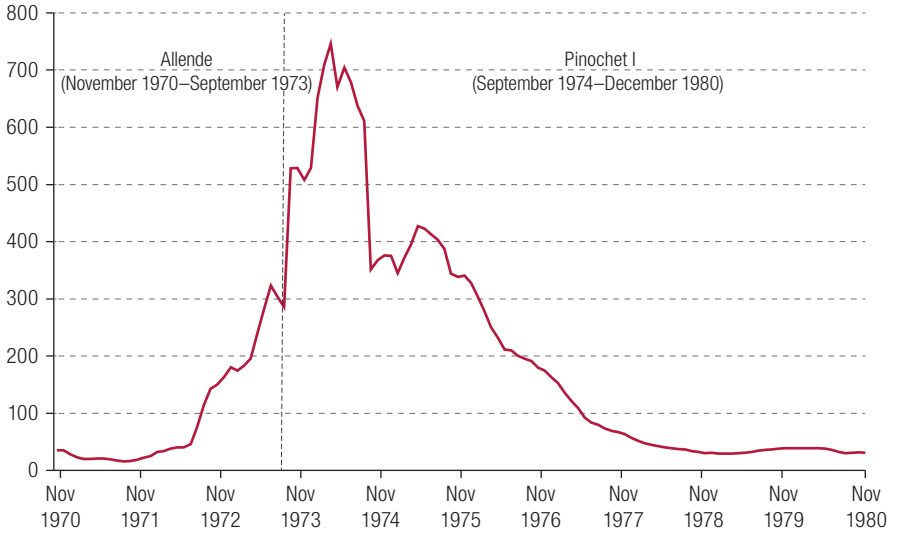
The Klein-Saks mission argued that the state of government finances, particularly the extremely high fiscal deficit, was at the root of the inflationary process. In the period preceding the Allende government, monetary issuance helped to finance fiscal deficits, while also giving rise to high levels of inflation, which became an endemic problem for the Chilean economy. This was the case from the establishment of the Central Bank of Chile in 1925 to the return to democracy in 1990. Perhaps one of the main characteristics of the Allende government is that this interdependence between inflation and fiscal deficits intensified to unprecedented levels.

As shown in table 1, average annual inflation during the Allende government was 231%, while the growth in monetary issuance stood at 226%. At the same time, fiscal deficits averaged 14% of GDP. These figures are much higher than in previous periods and represent a constant in Chile's monetary history since 1925: an example of fiscal dominance.[9] Fiscal dominance is understood as the process through which fiscal deficits are financed by issuance. In this sense, fiscal policy (financing deficits) "dominates" monetary policy, which is passive.

[9] See Caputo (2025) for a more in-depth discussion.

The above analysis leads to the conclusion that inflation increased significantly under the Allende government, and this is related to the financing of fiscal deficits through monetary issuance. A recurring question is how the dictatorship addressed this situation following the military coup. In this regard, two stylized facts should be mentioned. First, annual inflation, which was close to 300%, accelerated even more after the coup, climbing to 500% in late 1973 and around 800% in mid-1974 (see figure 1). In 1977, almost three years after the coup, annual inflation remained above 100%. Inflation did not stabilize until 1979, when it was decided to fix the exchange rate against the dollar. The second stylized fact is that fiscal deficits narrowed considerably during the first seven years of the military dictatorship, as shown in table 1. Specifically, in the period 1973–1980, referred to as "Pinochet I", fiscal accounts remained practically balanced, with a deficit around 0% of GDP.

Figure 1
Annual inflation: comparison between Allende and Pinochet I, November 1970–November 1980
(Percentages)



Source: Prepared by the authors, on the basis of data from the Central Bank of Chile.

The persistent inflation following the military coup, coupled with the fall in fiscal deficits, raises the question of how inflation could have remained high despite the elimination of fiscal deficits. To answer this question, a simple monetarist model will be used to shed light on why unyielding inflationary pressures have coexisted with fiscal balance.

As explained in section III, successfully reducing inflation is not merely a question of eliminating its root (or structural) causes: fiscal deficits. These changes need to be perceived by agents as permanent; in other words, agents should expect that these fiscal deficits will decrease in the future.

III. Inflation, issuance and fiscal deficit: a generalized Cagan model

Cagan's (1956) inflation model is based on a general function for the demand for real cash balances, which is expressed as:

$$m_t - p_t = \alpha E_t(\pi_{t+1}) + \beta y_t, \alpha, \beta > 0 \quad (1)$$

where m is the logarithm of the money supply; p is the logarithm of the price level; π^e is expected inflation, i.e. the expectation of $(p_{t+1} - p_t)$.[10] The variable u_t represents the importance of output levels, in logarithms, for the demand for money. Using equation (1), and assuming that future inflation is $x_{t+1} = p_{t+1} - p_t$, with rational expectations, we can express expected inflation, $E_t(\pi_{t+1})$, as:

$$E_t(\pi_{t+1}) = E_t x_{t+1} \tag{2}$$

where $E_t x_{t+1}$ is the mathematical expectation of x_{t+1}, conditional on the information at time t. Using (1) and (2), we can demonstrate that inflation expectations depend on two elements: (i) expected money supply growth, $\mu_{t+j} = m_{t+j} - m_t$, for all $j > 1$; and (ii) expected future real GDP growth, $E_t(y_{t+j} - y_{t+j-1})$, for all $j > 1$. In this way, expected inflation, π^e_t, is expressed as:

$$\begin{aligned} E_t(\pi_{t+1}) &= \frac{1}{1+\alpha}\sum_{j=1}^{\infty}\left(\frac{\alpha}{1+\alpha}\right)^{j-1} E_t \mu_{t+j} \\ &- \frac{\beta}{1+\alpha}\sum_{j=1}^{\infty}\left(\frac{\alpha}{1+\alpha}\right)^{j-1} E_t\left(y_{t+j} - y_{t+j-1}\right) \end{aligned} \tag{3}$$

Monthly GDP data for Chile (monthly index of economic activity) from 1996 to April 2024 indicate that this variable is stationary, with an expected value that is not statistically different from zero.[11] The model in (3) can thus be expressed as:[12]

$$E_t(\pi_{t+1}) = \frac{1}{1+\alpha}\sum_{j=1}^{\infty}\left(\frac{\alpha}{1+\alpha}\right)^{j-1} E_t \mu_{t+j} \tag{4}$$

Equation (4) characterizes the systematic component of expected inflation, $E_t(\pi_{t+1})$, as a function of expected money growth in future periods, $E_t\mu_{t+j}$.[13] There is thus a causal relationship between expected money creation by the monetary authority and expected inflation. One important aspect of equation (4) is that expected inflation for the following period, $E_t(\pi_{t+1})$, depends on expected money creation for the following month, $E_t\mu_{t+1}$, as well as on the entire trajectory of future expected money growth.

On the basis of (4), two simple theoretical exercises are considered to illustrate which mechanisms can perpetuate hyperinflationary processes, or drastically reduce them.

1. Unanticipated and credible change in the issuance rate

The first exercise assumes that the rate of monetary expansion, μ_t, is constant up to a certain period, $t = t_0$. In particular, $\mu_t = \mu > 0$ for all $t < t_0$. Let us assume that the monetary authority in period t_0 announces that monetary issuance will fall to 0 from that date forward. Specifically, it announces that

[10] The model in (1) can be estimated with cointegration techniques and using error correction methods that assume that cash balances are not always at equilibrium. In such models, the long-term relation between real balances and inflation expectations and the level of output holds, but cash balances gradually converge in the long run (see Phylaktis and Taylor (1993) for an in-depth discussion of this topic). In monthly terms, the difference between actual and long-term balances can be significant. However, in annual terms, this difference tends to diminish. Section IV provides an empirical analysis of such models with annual data.

[11] The data for the monthly index of economic activity for the period January 1996–April 2024 can be accessed through the Central Bank of Chile website [online]: https://bcentral.cl/areas/estadisticas/imacec.

[12] Where expected GDP growth is a non-zero constant, equation (4) remains valid and the relationship between expected inflation and future issuance remains proportional. The only difference is that a non-zero constant would be added to this relationship, which, nevertheless, would not affect the joint dynamics of expected inflation and issuance.

[13] This does not require that the demand for cash in (1) exclude the element of real GDP as an argument. It requires GDP growth to be stationary and expected growth to be constant. In the case of Chile, expected monthly GDP growth is not statistically different from zero, such that equation (4) becomes a valid model for expected inflation, without requiring the coefficient β in (1) to be zero.

$\mu_t = 0$ for all $t > t_0$. On the basis of equation (4), it can be determined that, for all $t < t_0$, economic agents do not anticipate any changes in the central bank's behaviour concerning the rate of monetary expansion. That is, the following is true for all $t < t_0$:

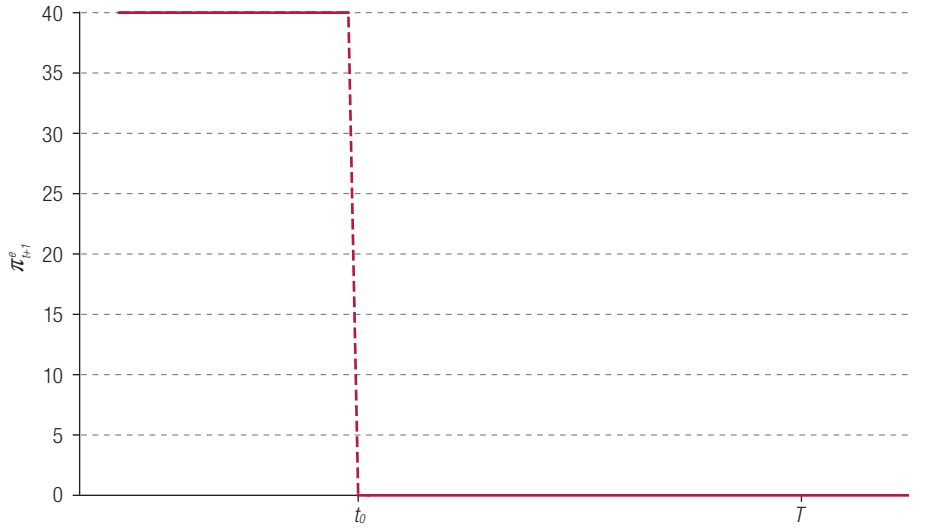
$$E_t(\pi_{t+1}) = \frac{1}{1+\alpha}\sum_{j=1}^{\infty}\left(\frac{\alpha}{1+\alpha}\right)^{j-1}E_t\mu = \mu \tag{5}$$

where we have used the property that $\sum_{j=1}^{\infty}\left(\frac{\alpha}{1+\alpha}\right)^{j-1} = 1+\alpha$ and $E_t\mu = \mu$. The monetary authority then announces unexpectedly in $t = t_0$ that the issuance rate will be $\mu = 0$ from t_0 onwards. If this announcement is credible, equation (5) for all $t > t_0$ becomes:

$$E_t(\pi_{t+1}) = \frac{1}{1+\alpha}\sum_{j=1}^{\infty}\left(\frac{\alpha}{1+\alpha}\right)^{j-1}E_t\mu = 0 \tag{6}$$

To illustrate the previous point, we have plotted equations (5) and (6) under the assumption that $\mu_t = 40\%$ for all $t < t_0$, while $\mu_t = 0$ for all $t > t_0$. This exercise does not require that a value be determined for the coefficient α, thus it is a general result that only requires determining the levels of growth of the monetary base before and after $t = t_0$. Figure 2 presents the dynamics of expected inflation, which is equivalent to 40% up to $t = t_0$.

Figure 2
Inflation and issuance rate (μ_t): unanticipated and credible change in t_0
(Percentages)



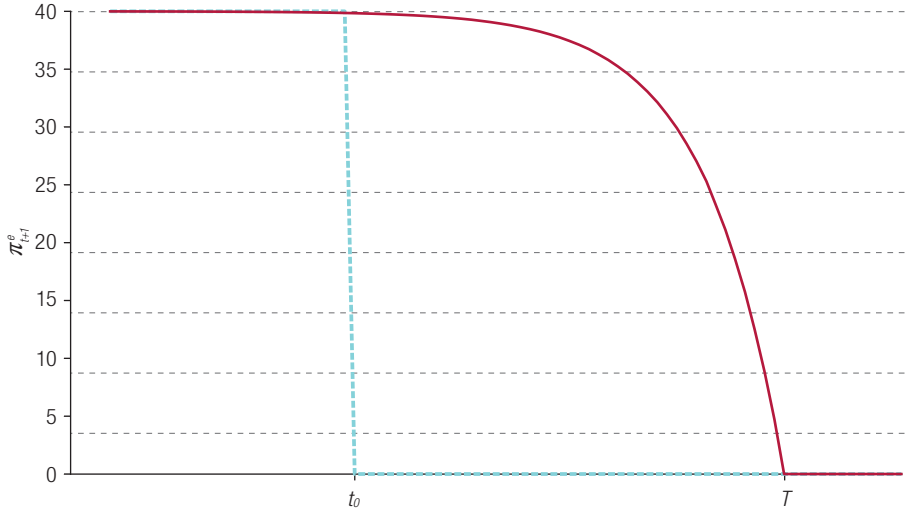
Source: Prepared by the authors, on the basis of equation (6).

2. Announced change in the issuance rate

Using Cagan's model in equation (4), an alternative exercise consists in the monetary authority announcing at t_0 that it will reduce monetary issuance to 0 in the future; in particular, it will bring issuance to $\mu_T = 0$ starting from $t = T$. Since this change is expected by economic agents, expected inflation will be equal to 0 from $t > T$ onwards. One important result is that, from the time of the announcement, i.e. from $t = t_0$, expected inflation, generated from (4), will incorporate future money growth, $\mu_T = 0$, from $t = T$

onwards and contemporaneous money growth, $\mu_t = 40\%$, for all $t < T$. Thus, credible announcements regarding future reductions in monetary issuance drive down inflation. This can be seen in figure 3, which shows how inflation gradually falls to 0 from $t = T$ onwards.[14]

Figure 3
Inflation and issuance rate (μ_t): anticipated change in T
(Percentages)



Source: Prepared by the authors, on the basis of equation 4.

If the government were to announce today, at $t = t_0$, that monetary issuance will be reduced immediately to $\mu = 0$, but economic agents expect this change to come into effect only from $t = T$, inflation will remain at levels consistent with $\mu = 0$. In this case, expected inflation will approach zero much more slowly owing to the lack of credibility in monetary policy announcements and will follow the trends presented in figure 3.

3. Monetary issuance and fiscal deficits

What elements explain the lack of credibility of a given announcement on future growth in the money supply? Equations (4), (5) and (6) relate inflation expectations to expected monetary issuance, but they do not specify the factors that may underlie the latter. To determine the factors that may lead to anticipating a given growth rate for issuance, we analyse the link between the monetary expansion rate and fiscal deficits. To this end, we specify the budget constraint of the central government, including the central bank. This constraint is expressed as:

$$\left(G_t - T_t\right) + \left(1 + r_{t-1}\right)B_{t-1} = \frac{M_t - M_{t-1}}{P_t} + B_t \qquad (7)$$

The right hand side of (7) represents the financing needs of the treasury. The first component is the fiscal deficit, $(G_t - T_t)$, which is the difference between expenditures (G) and tax revenues (T). The second component is the interest (and principal) payments associated with the fiscal debt (B) acquired

[14] To conduct this exercise, we use the estimate for coefficient , which is derived from the estimation of equation (1) in Caputo (2022). This study, like those of Phylaktis and Taylor (1993) and Sargent, Williams and Zha (2009), shows that the demand for money in Chile from 1970 to 1980 can be represented by a relationship similar to (1).

in the previous period, $(1 + r_{t-1})B_{t-1}$. These financing needs are covered by two sources: monetary issuance in real terms, $\frac{M_t - M_{t-1}}{P_t}$, and the issuance of new debt, B_t. If we assume that new debt issuance can cover the payment of the previous debt, together with the interest payment —that is, if we assume that $(1 + r_{t-1})B_{t-1} = B_t$—, then equation (7) can be expressed as follows:

$$(G_t - T_t)P_t = \frac{M_t - M_{t-1}}{M_{t-1}} M_{t-1} = \mu_t M_{t-1} \tag{8}$$

Dividing both sides of equation (8) by the nominal GDP, $P_t Y_t$, and multiplying the right hand side of (8) by M_t, we obtain the following expression for the issuance rate, μ_t:

$$\mu_t = \frac{d_t}{l_t - d_t} \tag{9}$$

Equation (9) is an expression for the monetary issuance rate that can sustain a given fiscal deficit (as a percentage of GDP). This issuance rate also depends on the liquidity in an economy, understood as nominal balances as a share of GDP, d_t. Taking partial derivatives in (9), with respect to the deficit, d_t, and liquidity, l_t, we obtain the following expressions:

$$\frac{\partial \mu_t}{\partial d_t} = \frac{l_t}{(l_t - d_t)^2} > 0 \tag{10}$$

$$\frac{\partial \mu_t}{\partial l_t} = \frac{-d_t}{(l_t - d_t)^2} < 0 \tag{11}$$

Equation (10) shows that as fiscal deficits as a share of GDP grow, the issuance rate needs to increase. This increase is greater as fiscal deficits, d_t, widen. In other words, the relationship between the issuance rate and fiscal deficits is non-linear.[15] Meanwhile, equation (11) shows that as liquidity in the economy, understood as $\frac{M_t}{P_t Y_t}$, falls, larger increases in the rate of issuance, μ_t, are needed to sustain a given level of fiscal deficit via issuance. In other words, the less money people keep as a percentage of GDP, the higher the inflation tax needed to achieve a given level of tax revenue. Conversely, if people are willing to increase cash balances as a percentage of GDP, the inflation tax that sustains a given fiscal deficit is lower.

Replacing equation (9) in equation (4), we obtain a relationship linking expected inflation with future fiscal deficits and expected liquidity in the economy:

$$E_t(\pi_{t+1}) = E_t x_{t+1} = \frac{1}{1+\alpha} \sum_{j=1}^{\infty} \left(\frac{\alpha}{1+\alpha}\right)^{j-1} E_t \left(\frac{d_{t+j}}{l_{t+j} - d_{t+j}}\right) \tag{12}$$

Equation (12) is fundamental to understanding how expectations regarding the future conduct of fiscal policy affect the rate of monetary issuance and, as a result, inflation expectations. Thus, if fiscal deficits are expected to increase steadily and, for example, balance holdings as a percentage of GDP, l_{t+j}, decrease, the expected issuance rate will rise, together with expected inflation. Section IV uses this model to understand inflation dynamics following the military coup.

[15] The non-linearity is clear if equation (10) differs, again, with respect to d_t. In particular, $\frac{\partial^2 \mu_t}{\partial d_t^2} = \frac{2l_t}{(l_t - d_t)^3} > 0$ when $l_t > d_t$. This inequality has always been the case in Chile, according to issuance and fiscal deficit data.

IV. Inflation and fiscal deficits: chronicle of a failed stabilization process

In this section, we will use the model in (12), together with properties of the issuance rate in (10) and (11), to understand the failed attempt at nominal stabilization following the 1973 military coup. To this end, we will first characterize the main macroeconomic variables during the Allende government and the military dictatorship. These variables are presented by year in table 2, which shows how GDP growth slowed considerably from 1972 to 1975, following a period of relatively high growth in the first two years of the Allende government. The growth of aggregate demand followed a similar pattern to GDP growth, although it contracted much more sharply during the first years of the military dictatorship.

Table 2
Macroeconomic indicators, 1970–1989

	GDP growth *(Percentages)*	Demand growth *(Percentages)*	Current account deficit *(Percentages of GDP)*	Fiscal deficit *(Percentages of GDP)*	Copper prices *(United States cents per pound)*	Inflation *(Percentages)*	Monetary issuance *(Percentages of GDP)*	Growth in currency issue *(Percentages)*
1970	1.9	1.8	1.2	1.4	61.3	34.9	7.9	66.1
1971	9.4	10.5	2.1	8.1	49.1	22.1	14.5	135.9
1972	-1.2	0.8	3.9	11.7	49.1	163.4	19.8	178.2
1973	-5.0	-5.8	2.8	22.5	78.4	508.1	22.7	365.0
1974	2.6	-3.1	1.9	10.5	90.2	375.9	10.8	319.6
1975	-13.0	-21.1	6.6	2.6	55.5	340.7	10.7	282.8
1976	3.7	-1.1	-1.5	2.3	64.1	174.3	11.0	271.6
1977	10.3	15.4	4.0	1.9	60.3	63.5	9.5	92.5
1978	7.8	9.2	6.9	0.9	62.2	30.3	9.0	59.2
1979	8.6	10.8	5.6	-1.7	88.5	38.9	8.6	52.7
1980	8.2	9.5	6.9	-1.7	96.8	31.2	8.4	37.3
1981	6.7	12.3	13.9	0.0	78.7	9.5	6.6	-6.9
1982	-11.1	-19.1	9.2	-0.3	65.8	20.7	4.8	-29.3
1983	-5.4	-9.1	5.6	-0.4	71.9	23.1	4.4	13.6
1984	4.0	6.4	10.9	0.7	61.3	23.0	4.3	17.6
1985	4.3	-1.0	8.1	0.6	61.0	26.4	3.9	34.1
1986	5.4	4.8	6.4	0.4	61.6	17.4	4.2	37.3
1987	6.5	9.5	3.4	-2.3	77.8	21.5	3.9	23.7
1988	7.3	7.6	0.9	-4.5	114.6	12.7	4.0	32.0
1989	10.0	12.1	2.3	-6.1	124.9	21.4	3.9	22.6

Source: Prepared by the authors, on the basis of J. Díaz, R. Lüders and G. Wagner, *Chile 1810-2010: la república en cifras. Historical statistics*, Santiago, Ediciones UC, 2016, and data from the Central Bank of Chile, the National Institute of Statistics (INE) and the Budgetary Affairs Bureau.

Regarding fiscal variables, table 2 shows how the public deficit climbed from 1.4% of GDP in 1970 to 22.5% of GDP in 1973. Although this deficit fell sharply after the military coup, it remained high (10.5% of GDP), approaching the averages of the first years of the Allende government (1971–1972). By 1975 and 1976, these deficits began to fall, though they hovered at around 2.5% of GDP. Inflation rose to 508.1% in 1973 and remained very high in 1974–1976, with an annual average above 200%. The growth in currency issue, which stood at 178.2% in 1972, jumped to 365% in 1973 and remained high, at close to 300%, from 1974 to 1976.

The information in table 2 allows us to identify four stylized facts during the Allende government that carry over into the first years of the dictatorship. The first is that, although fiscal deficits narrowed after the military coup, they continue to be very high in 1974, only falling notably after 1975. The second

stylized fact is that, during the first three years of the dictatorship, growth in currency issue remains close to 300%, a rate not dissimilar to the average issuance growth during the Popular Unity government. The third stylized fact is that, although inflation moderates after the military coup, it averages close to 300% during the first three years of the dictatorship. Lastly, the fourth stylized fact is that issuance as a percentage of GDP, which measures liquidity l_t mentioned in section III, increases from 7.9% of GDP in 1970 to values close to 20% in 1972 and 1973 and decreases considerably during the first three years of the dictatorship, dropping to around to 10%.

How can the above set of stylized facts account for the persistent inflation and rising issuance rate following the military coup, particularly considering that the fiscal deficit undergoes such a major adjustment from 1974 to 1976? In what follows, we will use the analysis framework developed in section III to explain an apparent paradox: during the dictatorship, inflation remained high despite a significant fiscal adjustment (narrowing of the deficit).

Below, we express equation (12), which links the expected inflation, issuance rate and fiscal deficits that we derived from Cagan's generalized model. Assuming, for illustrative purposes, that issuance and fiscal deficits remain at a given level during a given economic regime, equation (12) can be expressed as:

$$E_t\left(\pi_{t+1}\right) = E_t\left(\mu_T\right) = E_t\left(\frac{d_T}{l_T - d_T}\right) \tag{13}$$

Where μ_t is the annual issuance rate in a particular economic regime and d_T and l_T represent fiscal deficits and liquidity in the economy, respectively, with both variables expressed as a percentage of GDP. Period T can be interpreted as the last period of a given economic policy regime. On the basis of equation (13), it is possible to evaluate the impact of changes in the fiscal deficit and in the economy's liquidity on the issuance rate.

Recalling that $\mu_T = \frac{d_T}{l_T - d_T}$, we can express the change in μ_T over time as:

$$\begin{aligned}\frac{\partial \mu_T}{\partial t} &= \frac{\partial \mu_T}{\partial d_T}\frac{\partial d_T}{\partial t} + \frac{\partial \mu_T}{\partial l_T}\frac{\partial l_T}{\partial t} \\ &= \frac{l_T}{\left(l_T - d_T\right)^2}\frac{\partial d_T}{\partial t} - \frac{d_T}{\left(l_T - d_T\right)^2}\frac{\partial l_T}{\partial t}\end{aligned} \tag{14}$$

Equation (14) is critical to understanding the dynamics of issuance as a function of changes in fiscal deficits and liquidity in the economy. Specifically, as fiscal deficits narrow over time, that is, to the extent that $\frac{\partial d_t}{\partial t}$ is negative, the issuance rate, μ_t, should fall, which would decrease expected inflation. If liquidity in the economy falls as a result of the behaviour of economic agents seeking to safeguard against high inflation, for example, then $\frac{\partial l_t}{\partial t}$ is negative. In equation (14), this implies that the issuance rate, which is needed to finance a given fiscal deficit, increases. Thus, equation (14) shows that the narrowing of fiscal deficits is a necessary condition to reduce the issuance rate, but it is not sufficient. Liquidity in the economy also needs to be maintained, or at least not decrease, in order to offset the impact of lower fiscal deficits on issuance. The intuition behind this result is that as the quantity of money in the economy decreases, a higher inflation tax is needed to sustain a given fiscal deficit.

How does the model in (14) explain the persistence of inflation and issuance growth after the military coup, in a context where the fiscal deficit falls sharply in 1974? To quantify the determinants of issuance and inflation following the coup, we estimate (14) for the immediate post-coup period. As shown in table 2, the fiscal deficit narrowed by 12% of GDP between 1973 and 1974. Specifically, $\frac{\partial d_t}{\partial t} = -12\%$. During the same period, liquidity in the economy also fell from 22.7% to 10.8% of GDP. In other words, $\frac{\partial l_t}{\partial t} = -12\%$. Incorporating these values into (14), and noting that the deficit and liquidity in the economy are almost identical in 1973, we obtain the following:

$$\frac{\partial \mu_T}{\partial t} = \frac{l_T}{(l_T - d_T)^2}\frac{\partial d_T}{\partial t} - \frac{d_T}{(l_T - d_T)^2}\frac{\partial l_T}{\partial t}$$
$$= \frac{l_T}{(l_T - d_T)^2}(-12\%) - \frac{d_T}{(l_T - d_T)^2}(-12) = 0 \quad (15)$$

That is, the sharp fall in the fiscal deficit during the first year of the dictatorship was not enough to reduce the monetary issuance rate in accordance with that deficit. According to the model, and assuming that liquidity in the economy had effectively materialized, a greater reduction in the fiscal deficit would have been needed. The shock therapy proposed by Friedman was not actually applied. The implication of zero change in the issuance rate is transferred directly to inflation expectations. Specifically:

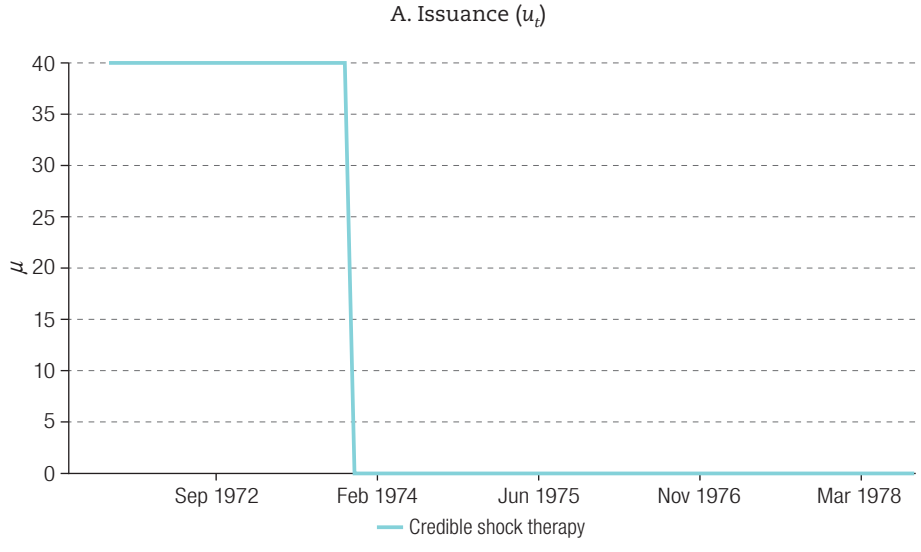
$$\frac{\partial E_t(\pi_{T+1})}{\partial t} = \frac{\partial E_T(\mu_T)}{\partial t} = 0 \quad (16)$$

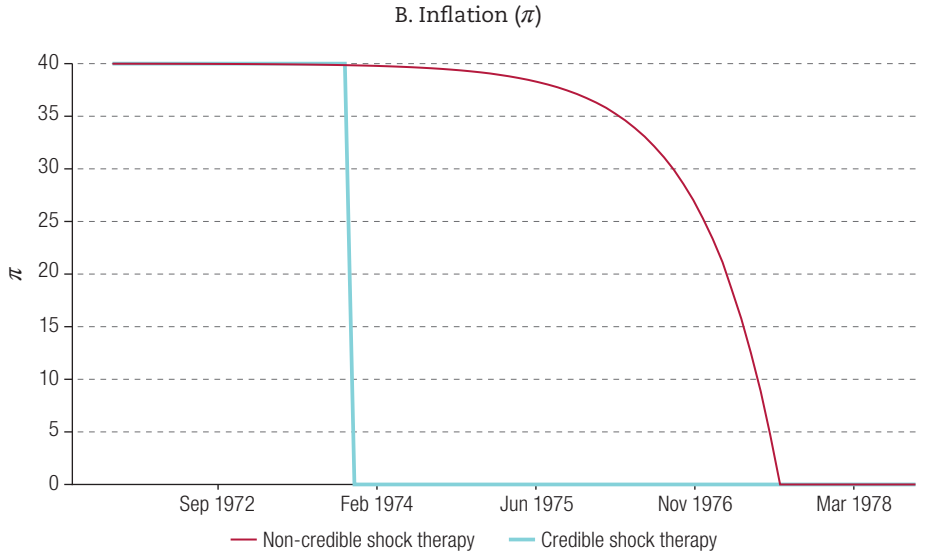
What are the consequences of the failed shock therapy in 1974? One conjecture is that persistent inflation, resulting from an insufficient adjustment of the fiscal deficit, created an expectation of gradual adjustments coupled with future adjustments to the issuance rate. To see the inflation trends that would have occurred in this scenario, we simulate the model in (4), expressed as:

$$E_t(\pi_{t+1}) = \frac{1}{1+\alpha}\sum_{j=1}^{\infty}\left(\frac{\alpha}{1+\alpha}\right)^{j-1} E_t \mu_{t+j} \quad (17)$$

The above model is simulated, over time and by month, for the two scenarios of the Chilean economy. The first assumes that the treasury is capable of making the fiscal adjustment necessary to bring the monetary issuance rate from 400% (average of the last two years of the Allende government) to 100% just after the military coup. The second scenario assumes that this is only possible around the beginning of 1978, for two reasons. The first is that the military government had announced that it would undertake a fiscal and monetary adjustment in the future. The second reason, which we deem more plausible, is that economic agents anticipated (correctly) that it would occur several years later in early 1978, after having seen the failed attempt at adjustment in 1974. Figure 4 shows inflation trends under each scenario.

Figure 4
Monetary model: issuance (μ_t) and inflation (π), 1972–1978
(Percentages)



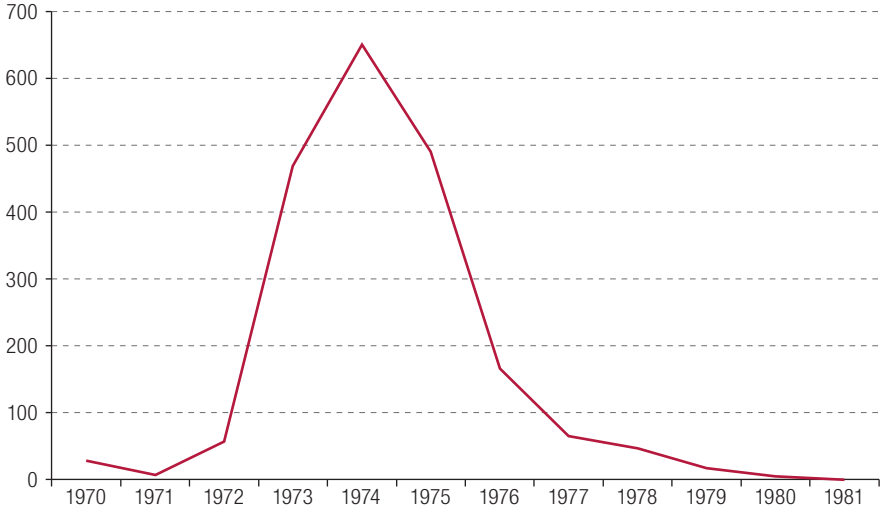


Source: Prepared by the authors.
Note: It is assumed that the semi-elasticity coefficient of cash demand to expected inflation is . In the credible shock therapy scenario, the issuance rate falls from 400% to 100%, while in the non-credible shock therapy scenario, the issuance rate is expected to fall to 100% only in early 1978.

Figure 4 shows that the inflation in Chile after the military coup is consistent with the scenario of non-credible shock therapy, in which agents do not expect the issuance rate or inflation to fall. In this context, an anticipated future adjustment to the issuance rate results from the lack of credibility of an immediate adjustment.

Before concluding, we briefly analyse an important variable in an open economy: the exchange rate. As shown in figure 5, the depreciation of the exchange rate closely follows rising inflation and issuance. Our interpretation is that exchange rate fluctuations stem from movements in the quantity of money in the economy and induce inflationary effects consistent with higher issuance.

Figure 5
Nominal exchange-rate depreciation, 1970–1981
(Annual percentage variation)



Source: Central Bank of Chile.

V. Conclusions

The first years of the military dictatorship in Chile were marked by high inflation, which only stabilized in the late 1970s. This is paradoxical, since the characteristics of the economic policies adopted by the dictatorship were, by and large, completely opposed to those implemented during the Popular Unity government. This study set out to understand why —despite the radical political and economic changes following the 1973 military coup, in line with the economic shock programme recommended by Milton Friedman— inflation was not brought under control until 1979.

The failed nominal stabilization during the dictatorship, understood as the reduction of inflation, is analysed using a monetarist model with rational expectations. We conclude that two causes explain the persistent inflation in those years. First, the fall in the fiscal deficit in 1974 was unable to curb the high rate of monetary issuance or to dampen actual (and expected) inflation. This is the result not only of the insufficient narrowing of the deficit, but also of the lower liquidity in the economy, understood as a smaller monetary base as a share of GDP, which has been the case since 1974. The latter corresponds to a reduction in the inflation tax base, which perpetuates the high levels of inflation needed to finance a given fiscal deficit. The second cause, linked to the first, is that economic agents perceived that monetary and fiscal policy from 1974 onwards would not be able to slow the growth rate of the monetary base and inflation. In light of the data and the model developed in this paper, we conclude that a successful shock therapy would have required a greater narrowing of the fiscal deficit following the 1973 military coup, together with the perception that these lower deficits would be sustained over time. In the absence of a credible deficit reduction policy, inflation only stabilizes in the late 1970s, which according to monetarist models amounts to a nominal adjustment that is not perceived as immediate.

Bibliography

Aldunate, F. and others (2020), "Privatization and business groups: evidence from the *Chicago Boys* in Chile", *Explorations in Economic History*, vol. 78, October.

Bosworth, B. P., R. Dornbusch and R. Labán (eds.) (1994), *The Chilean Economy: Policy Lessons and Challenges*, Brookings Institution Press.

Cagan, P. (1956), "The monetary dynamics of hyperinflation", *Studies in the Quantity Theory of Money*, M. Friedman (ed.), University of Chicago Press.

Caputo, R. (2025), "Política monetaria en Chile desde 1970: persistente inflación y dominancia fiscal", *Historia económica de Chile: más allá del crecimiento*, M. Llorca-Jaña and R. Miller (eds.), Fondo de Cultura Económica.

___(2022), "Addiction to inflation or to fiscal deficits? The Chilean experience of 1970s", *International Journal of Finance & Economics*, vol. 27, Nº 1, January.

Caputo, R. and D. Saravia (2022), "The case of Chile", *A Monetary and Fiscal History of Latin America, 1960–2017*, T. J. Kehoe and J. P. Nicolini (eds.), Washington, D.C., University of Minnesota Press.

Carrasco, C. (2009), "El Banco Central de Chile abre sus puertas", *Banco Central de Chile 1925-1964: una historia institucional*, vol. 1, Santiago, Central Bank of Chile.

Corbo, V. (1985), "Reforms and macroeconomic adjustments in Chile during 1974–1984", *World Development*, vol. 13, No. 8, August.

Corbo, V. and S. Fischer (1994), "Lessons from the Chilean stabilization and recovery", *The Chilean Economy: Policy Lessons and Challenges*, B. P. Bosworth, R. Dornbusch and R. Labán (eds.), Washington, D.C., Brookings Institution Press.

Díaz, J., R. Lüders and G. Wagner (2016), *Chile 1810-2010: la república en cifras. Historical statistics*, Santiago, Ediciones UC.

Edwards, S. (2023), "The debauchery of currency and inflation: Chile, 1970-1973", *Working Paper*, No. 31890, National Bureau of Economic Research (NBER).

___(2007), "Establishing credibility: the role of foreign advisors in Chile's 1955-1958 stabilization program", *The Decline of Latin American Economies: Growth, Institutions, and Crises*, S. Edwards, G. Esquivel and G. Márquez (eds.), National Bureau of Economic Research (NBER)/University of Chicago Press.
Edwards, S. and A. Cox Edwards (1987), *Monetarism and Liberalization: The Chilean Experiment*, University of Chicago Press.
Ffrench-Davis, R. (2003), "Chile, entre el neoliberalismo y el crecimiento con equidad", *Nueva Sociedad*, vol. 183, January-February.
___(1983), "The monetarist experiment in Chile: a critical survey", *World Development*, vol. 11, No. 11, November.
___(1979), "Exports and industrialization in an orthodox model; Chile, 1973-1978", *CEPAL Review*, No. 9 (E/CEPAL/G.1096), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC).
Friedman, M. and R. Friedman (1998), *Two Lucky People: Memoirs*, University of Chicago Press.
González, F. and F. Vial (2021), "Collective action and policy implementation: evidence from Salvador Allende's expropriations", *The Journal of Economic History*, vol. 81, No. 2, June.
González, F. and M. Prem (2023), "Government support in times of crisis: evidence from Chile's road to socialism" [online] https://fagonza4.github.io/milk.pdf.
González, F., M. Prem and F. Urzúa (2020), "The privatization origins of political corporations: evidence from the Pinochet regime", *The Journal of Economic History*, vol. 80, No. 2, June.
Larraín, F. and P. Meller (1991), "The socialist-populist Chilean experience, 1970-1973", *The Macroeconomics of Populism in Latin America*, R. Dornbusch and S. Edwards (comps.), National Bureau of Economic Research (NBER).
Larraín, F. and R. Vergara (2000), "Un cuarto de siglo de reformas fiscales", *La transformación económica de Chile*, F. Larraín and R. Vergara (eds.), Santiago, Centre for Public Studies.
Lorenzoni, G. and I. Werning (2023), "Inflation is conflict", *Working Paper*, No. 31099, National Bureau of Economic Research (NBER).
Nazer, R. (2021), "La crisis del modelo de desarrollo y las reformas estructurales, 1952-1970", *Historia económica de Chile desde la independencia*, M. Llorca-Jaña and R. M. Miller (eds.), Santiago, RIL Editores.
Phylaktis, K. and M. P. Taylor (1993), "Money demand, the Cagan model and the inflation tax: some Latin American evidence", *The Review of Economics and Statistics*, vol. 75, No. 1, February.
Reinhart, C. and K. Rogoff (2009), *This Time Is Different: Eight Centuries of Financial Folly*, Princeton University Press.
Rowthorn, R. E. (1977), "Conflict, inflation and money", *Cambridge Journal of Economics*, vol. 1, No. 3, September.
Sargent, T. J. (2013), *Rational Expectations and Inflation*, third edition, Princeton University Press.
Sargent, T. J., N. Williams and T. Zha (2009), "The conquest of South American inflation", *Journal of Political Economy*, vol. 117, No. 2, April.
Velasco, A. (1994), "The state and economic policy: Chile 1952–92", *The Chilean Economy: Policy Lessons and Challenges*, B. P. Bosworth, R. Dornbusch and R. Labán (eds.), Washington, D.C., Brookings Institution Press.
Vuskovic, P. (1971), "La política económica de la transición al socialismo", address to the Inter-American Committee on the Alliance for Progress (CIAP).